UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/586,387	10/02/2006	Gunther Leising	00366.000213.	1804

5514 7590 06/22/2009

FITZPATRICK CELLA HARPER & SCINTO
30 ROCKEFELLER PLAZA
NEW YORK, NY 10112

EXAMINER	
HUBER, ROBERT T	

ART UNIT	PAPER NUMBER
2892	

MAIL DATE	DELIVERY MODE
06/22/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/586,387	LEISING, GUNTHER	
	Examiner	Art Unit	
	ROBERT HUBER	2892	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 April 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 July 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1 and 4 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Mueller et al. (US 6,417,019 B1, prior art of record).

a. Regarding claim 1**, Mueller discloses a method for the producing a white LED of predetermined color temperature** (e.g. figure 6), **comprising**:

coating with a conversion layer at least one of a blue LED or a UV LED of a plurality of LEDs (LED 8, disclosed in col. 5, lines 30 – 31 to emit blue or UV light. Col. 8, lines 1 – 2 refer to "*phosphor coated LEDs*", indicating a plurality of LEDs. Furthermore, col. 8, lines 21 – 23 discloses forming individual LEDs from an LED wafer, which is coated with a phosphor film prior to LED separation), **said conversion layer absorbing at least one of blue light or UV light, and emitting light of greater wavelength** (conversion layer 42 made of phosphor particles. Col. 8, lines 10 – 14 disclose the emission of longer wavelengths from the phosphor particles that are excited from the blue or UV light of the LED),

wherein an exact wavelength of the LED is determined before the coating step with a conversion layer (e.g. col. 3, lines 65 – 66 disclose the AlInGaN LED to emit light with a peak wavelength of 450 nm. Col. 4, line 65 discloses the LED 8 to be a AlInGaN LED) **wherein said the color conversion layer comprising a color conversion agent is applied over the LED in a quantity and concentration dependent upon the determined wavelength** (e.g. col. 7, lines 26 - 30 and col. 9, lines 60 – 65 disclose adjusting the composition and concentration of the phosphor particles in a conversion layer in response to desired chromaticity (wavelength) of the LED).

Although Mueller does not specifically state that "*an exact wavelength of the LED is determined before the coating step with a conversion layer*", Mueller does disclose that the exact wavelength of the LEDs used in the invention is 450 nm (col. 3, lines 65 – 66). **Therefore, it would have been obvious to one of ordinary skill in the art to determine the exact wavelength of the LED prior to the formation of the color conversion layer since it was specified that the LEDs used in the invention should have an exact wavelength of 450 nm. One would be motivated to determine the exact wavelength prior to the coating stop to ensure that the LEDs being coated emit a light with the desired wavelength in order to properly excite the conversion layer, and yield the desired wavelength of light output.**

b. Regarding claim 4, **Mueller discloses the method according to claim 1, as cited above, wherein the color conversion agent is applied by means of deposition in a gas phase** (col. 8, lines 36 - 40 disclose various gas-phase deposition methods), **wherein at least one of a quantity of said color conversion agent and a concentration of said color conversion agent is selected depending upon the exact wavelength** (e.g. col. 7, lines 26 - 30 and col. 9, lines 60 – 65 disclose adjusting the composition and concentration of the phosphor particles in a conversion layer in response to desired chromaticity (wavelength) of the LED).

3. Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mueller et al. in view of Jones et al. (WO 00/12226, prior art of record).

a. Regarding claim 2, **Mueller discloses the method according to claim 1, as cited above, wherein at least one of a quantity of said color conversion agent and a concentration of said color conversion agent is selected depending upon the exact wavelength** (e.g. col. 7, lines 26 - 30 and col. 9, lines 60 – 65 disclose adjusting the composition and concentration of the phosphor particles in a conversion layer in response to desired chromaticity (wavelength) of the LED). **Mueller is silent with respect to the color conversion agent being applied by means of at least on of a dispenser and a stamp.**

Jones discloses a method of forming a white LED (e.g. figure 1) **in which a blue or a UV LED** (LED formed by electrode 12, layer 13 and electrode 14) **is coated with a conversion layer** (layer 16), **wherein the color conversion agent is applied by means of at least one of a dispenser and a stamp** (dispenser 1, disclosed on page 5, line 31).

It would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the method of Mueller to include the formation of the light conversion layer by means of a dispenser, as taught by Jones, since Jones discloses a method of forming a very similar structure to that of Mueller, but incorporates a formation of the conversion layer by means of a dispenser. One would have been motivated to use a dispenser since it is an effective way of forming a conversion layer on an LED, while reducing the harmful effects to the LED from lithography, as disclosed by Jones (page, 3, lines 17 - 26).

b. Regarding claim 3, **Mueller discloses the method according to claim 1, as cited above, wherein at least one of a quantity of said color conversion agent and a concentration of said color conversion agent is selected depending upon the exact wavelength** (e.g. col. 7, lines 26 - 30 and col. 9, lines 60 – 65 disclose adjusting the composition and concentration of the phosphor particles in a conversion layer in response to desired chromaticity (wavelength) of the LED). **Mueller is silent with respect to the color conversion agent being applied by means of inkjet printing.**

Jones discloses a method of forming a white LED (e.g. figure 1) **in which a blue or a UV LED** (LED formed by electrode 12, layer 13 and electrode 14**) is coated with a conversion layer** (layer 16), **wherein the color conversion agent is applied by means of inkjet printing** (page 5, line 28 - 31).

It would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the method of Mueller to include the formation of the light conversion layer by means of a inkjet printing, as taught by Jones, since Jones discloses a method of forming a very similar structure to that of Muller, but incorporates a formation of the conversion layer by means of a inkjet printing. One would have been motivated to use inkjet printing since it is an effective way of forming a conversion layer on an LED, while reducing the harmful effects to the LED from lithography, as disclosed by Jones (page, 3, lines 17 - 26).

4. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mueller et al. in view of Collins, III et al. (US 2003/0181122 A1, prior art of record). **Mueller discloses the method of claim 4, as cited above, wherein said deposition of color conversion agent in gas phase** (col. 8, lines 36 - 40 disclose various gas-phase deposition methods). **Mueller is silent with respect to a mask, such as a photomask, is produced, apertures of said mask being selected depending upon the exact wavelength.**

Collins, III discloses a method of forming a white LED (e.g. figures 1A – 1F) **in which a blue or a UV LED** (LED 18, disclosed in ¶ [0005] may emit blue light) **is coated with a conversion layer** (layer 22, disclosed in ¶ [0021]), **wherein a mask, in particular a photomask, is produced** (mask formed by photoresist layer 20, disclosed in ¶ [0020] and [0021]), **apertures of said mask being selected in dependence upon the determined wavelength** (e.g. as disclosed in ¶ [0016] and [0023], the aperture 20c is controlled by the light exposure).

It would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the method of Mueller to include a mask, in particular a photomask, is produced, as taught by Collins, III, since Collins, III discloses a method of forming a very similar structure to that of Muller, but incorporates a formation a photomask in order to form the light conversion layer on the LED. One would have been motivated to form a photomask since can be used to form a controlled, patterned layer with various gas-deposition techniques (¶ [0004] of Collins, III).

The incorporation of the photomask of Collins, III with the method of deposition of the color conversion agent in the gas phase of Mueller renders obvious the limitation that the deposition of the color conversion agent in the gas phase is effected through the mask.

5. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mueller et al. in view of Wojnarowski et al. (US 6,483,196 B1, prior art of record). **Mueller discloses the method according to claim 1, as cited above, but is silent with**

respect to the color conversion agent being initially homogeneously applied and subsequently selectively removed by means of a laser in correlation with the exact wavelength.

Wojnarowski discloses a method of forming a white LED (e.g. figure 13, disclosed in col. 6, lines 44 - 50) **in which a blue or a UV LED** (LED 10) **is coated with a conversion layer** (layer 62 (not shown), disclosed in col. 6, lines 51 - 60), **wherein the color conversion agent is initially homogeneously applied** (e.g. as disclosed in col. 7, lines 1 – 8) **and subsequently removed by means of a laser in correlation with the exact wavelength** (e.g. as disclosed in col. 6, lines 55 – 60).

It would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the method of Mueller to include the formation of the color conversion layer by applying it homogenously and subsequently using a laser to selectively remove it, as taught by Wojnarowski, since Wojnarowski discloses a method of forming a very similar structure to that of Mueller, but incorporates a formation of the conversion layer by homogeneous formation and subsequent laser removal. One would have been motivated to apply the method of Wojnarowski since one can control the variations of the light output of the device by selectively removing portions of the conversion layer that adversely affect the device, as discussed in Wojnarowski (col. 6, lines 55 – 60).

6. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Liu (US 5,886,401) in view of Mueller et al. **Liu discloses a white LED light source** (col. 3, line

40), **comprising a plurality of LEDs** (e.g. figure 2, and col. 2, line 34 discloses a plurality of LEDs), **wherein above each of said LEDs a conversion layer having a thickness is disposed** (e.g. phosphor layer 125, disclosed in col. 3, line 39), **wherein the thickness of the conversion layer is proportional to the exact wavelength of light** (col. 3, lines 39 - 44 disclose the thickness of the conversion layer (phosphors) will depend on the color (wavelength) of the LED).

Liu is silent with respect to disclosing the LEDs comprise blue or UV LEDs. However, Liu discloses in the Background of the Invention that blue-green LEDs are known in the art (col. 1, line 14).

Mueller discloses that blue or UV LEDs may be coated with a conversion layer to produce various light colors (e.g. col. 8, lines 10 – 14)

It would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the device of Liu such that the LEDs of the device comprise blue or UV LEDs, since it was known in the art that blue LEDs may be used, as disclosed in the background of Liu, as well as disclosed by Mueller that either blue or UV emitting LEDs may be coated with a conversion layer to emit a variety of light colors. One would have been motivated to use blue or UV LEDs since blue or UV light has a higher energy wavelength and may be used to excite certain phosphors to emit longer wavelength of light (as disclosed by Mueller, col. 3, lines 35 - 37). Such a light emitting device would be advantageous in an array of LEDs used to as a white light source, since white light is comprised of at least the three primary colors (e.g. red, green, and blue).

Response to Arguments

7. Applicant's arguments with respect to claim 1 have been considered but are moot in view of the new ground(s) of rejection. At present, the prior art of Mueller et al. remains commensurate to the scope of the claims as stated by the Applicant within the context of the claim language and as broadly interpreted by the Examiner [MPEP 2111], which is elucidated and expounded upon above. In response to Applicants arguments that Mueller does not disclose determining the exact wavelength of the LED before coating the LED with a conversion layer, the Examiner respectfully disagrees. As cited above with respect to claim 1, Mueller discloses that the LEDs used in the device are known to have a wavelength of 450 nm (col. 3, lines 64 – 66). Since this is a known wavelength of the LEDs used in the device, at any later time of device production, the wavelength is already known. Therefore, one may consider the exact wavelength of the LED to be determined prior to device formation, and hence prior to the coating of the LED with the conversion layer during device fabrication. Furthermore, it would have been within the level of one of ordinary skill in the art to determine the exact wavelength of the LED prior to device formation, and hence prior to coating of the LED with the conversion layer, in order to ensure a proper (desired) wavelength output of the conversion layer since it was well-known that the emitted wavelength of the conversion layer depends on the exact wavelength of the LED. Hence, Mueller anticipates or renders obvious the claimed invention of claim 1.

8. Applicant's arguments with respect to claim 7 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ROBERT HUBER whose telephone number is (571)270-3899. The examiner can normally be reached on Monday - Thursday (9am - 6pm EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thao Le can be reached on (571) 272-1708. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Lex Malsawma/
Primary Examiner, Art Unit 2892

/Robert Huber/
Examiner, Art Unit 2892
June 15, 2009